

## CLAIMS

1. An elastomeric stamp (10) for printing a pattern on a substrate (500; 502) with an ink (520), the stamp (10) being at least partially formed from a first material, the stamp comprising a first surface (12) in a first plane, a second surface (14) in a second plane and a third surface (16) extending from the first surface (12) to the second surface (14), the third surface (16) being permeable to the ink (520), the first surface (12) comprising a barrier layer (22) being substantially impermeable to the ink (520).  
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2. An elastomeric stamp (10) as claimed in claim 1, wherein the barrier layer (22) is non-covalently bound to the first surface (12).
3. An elastomeric stamp (10) as claimed in claim 1, or 2, wherein the first barrier layer (22) comprises an inorganic oxide.  
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4. An elastomeric stamp (10) as claimed in claim 1 or 2, wherein the first barrier layer (22) comprises a polymer material.
- 20 5. An elastomeric stamp (10) as claimed in claim 1 or 2, wherein the first barrier layer (22) comprises the first material in a modified form.
6. An elastomeric stamp (10) as claimed in any of the claims 1-5, wherein the second surface (14) comprises a further barrier layer (24) being substantially impermeable to the ink (520).  
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7. An elastomeric stamp (10) as claimed in claim 6, wherein the first surface (12) and the third surface (16) form an angle between 60-90°.
- 30 8. An elastomeric stamp (10) as claimed in claim 6 or 7, wherein the further barrier layer (24) is of the same material as the barrier layer (22).

9. A method for printing an ink (520) in a pattern on a substrate (500; 502) of an electronic device using an elastomeric stamp (10), the elastomeric stamp (10) being at least partially formed from a first material, the elastomeric stamp (10) comprising a first surface (12; 22) in a first plane, a second surface (14) in a second plane and a third surface (16) extending from the first surface (12; 22) to the second surface (14), the third surface (16) being permeable to the ink (520), the first surface (12; 22) comprising a barrier layer (22) being substantially impermeable to the ink (520), the method comprising the steps of:
- 5 bringing the elastomeric stamp (10) into contact with a supply (510) of an ink solution;
- absorbing the ink solution in the first material;
- cleaning at least the barrier layer (22) of the elastomeric stamp (10);
- drying the elastomeric stamp (10); and
- 10 forming at least a part of the pattern by placing the elastomeric stamp (10) on the substrate (500; 502) with the barrier layer (22) contacting the substrate and transferring the ink (520) from the first material to the substrate (500; 502) via the third surface (14).
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- 20 10. A method as claimed in claim 9, wherein the step of cleaning at least the barrier layer (22) of the elastomeric stamp (10) comprises rinsing the elastomeric stamp (10) with a solvent.
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11. A method of producing a patterned elastomeric stamp (10) for printing an ink (520) on a substrate (500; 502) of an electronic device, the method comprising the steps of:
- providing a master (300) having a first surface (312) in a first plane, a second surface (314) in a second plane and a third surface (316) extending from the first surface (312) to the second surface (314);
- 30 depositing a first material precursor on said surfaces (312; 314; 316) of the master (300);

generating an elastomeric stamp (10) having a first surface (12) in a first plane, a second surface (14) in a second plane and a third surface (16) extending from the first surface (12) to the second surface (14) by transforming the first material precursor to a first material, said surfaces (12; 14; 16) of the  
5 elastomeric stamp (10) being permeable to the ink (520); and  
forming a barrier layer (22) on the first surface (12) of the elastomeric stamp (10), the barrier layer (22) being impermeable to the ink (520).

12. A method as claimed in claim 11, wherein the step of forming a barrier  
10 layer (22) on the first surface (12) of the elastomeric stamp (10) comprises  
anisotropically depositing a metal on the first surface (12) of the elastomeric  
stamp (10).

13. A method as claimed in claim 12, further comprising the step of  
15 oxidizing the barrier layer (22).

14. A method as claimed in claim 11, wherein the step of forming a barrier  
layer (22) on the first surface (12) of the elastomeric stamp (10) comprises  
forming a layer of polymer material on the first surface (12) of the elastomeric  
20 stamp (10).

15. A method as claimed in claim 14, wherein the step of forming a layer of  
a polymer material on the first surface (12) of the elastomeric stamp (10)  
comprises adhering a polymer material to the first surface (12) of the  
25 elastomeric stamp (10).

16. A method as claimed in claim 14, wherein the step of forming a layer of  
a polymer material on the first surface (12) of the elastomeric stamp (10)  
comprises depositing a precursor of the polymer material on the first surface  
30 (12) of the elastomeric stamp (10); and  
forming the layer of the polymer material from the precursor.

17. A method as claimed in claim 16, wherein the step of forming the layer of the polymer material from the precursor is preceded by depositing a polymerization initiator on the first surface (12) of the elastomeric stamp (10).
- 5 18. A method as claimed in claim 14, further comprising the steps of: modifying the first surface (312) of the master (300); and depositing a precursor of the polymer material on the modified first surface (322) of the master (300).
- 10 19. A method as claimed in claim 11, wherein the step of forming a layer (22) of a second material on the first surface (12) comprises modifying a layer of the first material at the first surface (12).
- 15 20. A method as claimed in any of the claims 11-19, further comprising the step of forming a further barrier layer (24) on the second surface (14) of the elastomeric stamp (10), the further barrier layer (24) being impermeable to the ink.
- 20 21. A method as claimed in claim 20, wherein the further barrier layer (24) is formed from a same material as the barrier layer (22).